

**FEATURED ARTICLE**

**DIRECTIONAL SOUND**

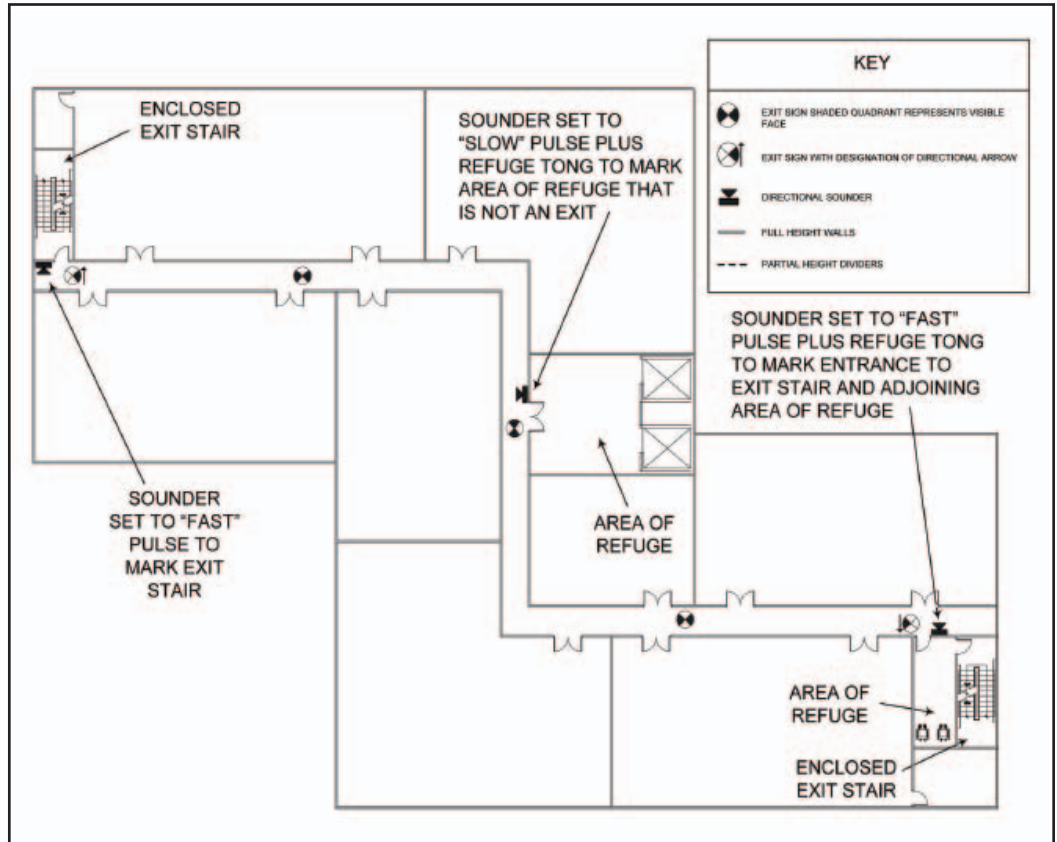
By Daniel J. O'Connor, P.E., Fellow SFPE

**D**irectional sound is a promising new technology that helps people find their way to an exit, refuge area, or some other means of egress during an emergency building evacuation, especially in cases of smoke or darkness. Directional sound introduces short bursts of broadband sound in a frequency range that is distinct from simultaneously operating fire alarm sounders, such as bells or horns. These pulses make use of our ability to localize sound sources produced by electronic signaling devices installed as part of a building's fire alarm. They provide additional sound cues that do not conflict with the traditional fire alarm system notification appliances.

System Sensor (division of Honeywell International), a major manufacturer of fire detection and notification products, is leading the introduction of directional sound technology in North America. The technology and initial applications were developed at the University of Leeds(UK) in partnership with SoundAlert Technology Plc under the supervision of Professor Deborah Withington, Professor of Auditory Neuroscience.

While directional sound is already recognized and accepted overseas, System Sensor wanted independent North American expertise to review the technology and assist with the development of an application guide. Schirmer Engineering was selected to lead this effort

based on its combination of technical fire alarm system design expertise, as well as practical experience designing and developing life safety concepts for a wide variety of buildings and occupancies. Schirmer assigned experts with backgrounds in acoustic engineering, human behavior during fire and evacuations, building and fire codes; and fire protection engineering to review available literature and assist in the development of an application guide.



*Example Application of directional sounders at exit stairways and areas of refuge.  
(Source: System Sensor ExitPoint directional sound Application Guide, Nov. 2004)*

**Silent signs are not enough**

Although building and life safety codes require exit signs be placed above exit doors and along egress routes, these signs do not always seem to help occupants find exits during an emergency. This observed behavior has been explained in terms of an established psychological concept known as learned irrelevance. Since occupants are continually exposed to the exit signs, but rarely need to respond to that ever-present stimulus, the signs become a learned irrelevance.

Directional sound is intended to provide sound cues that make it easier for occupants to locate a nearby exit or area of refuge as they move through the means of egress during an evacuation. Since sound has the advantage of penetrating in many directions, such as around corners, there is an inherent flexibility and efficiency compared with line-of-sight methods for marking exits. The figure above shows a sample installation.